Comparing Invasive Species and Habitat Loss

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Introduction

- Human activities causing an increase in species extinction rate and loss of biodiversity
- Evidence is sketchy but recent extinction rates may exceed “natural” or background rate of extinction by several orders of magnitude

Reasons for Concern

- Intrinsic value
- Utilitarian value
  - Ecosystem services
  - Genetic library (insurance)

Causes of Biodiversity Loss

- "Four Horsemen"
  - Habitat loss
  - Invasive species
  - Over-harvesting
  - Pollution/climate change

Comparing Habitat Loss and Invasive Species

- Habitat loss: unintended consequence of habitat conversion to human dominated land use
- Invasive: unintended consequence of trade

Strategies for Dealing with the Threat

- Habitat loss:
  - Land use (spatial pattern of economic activity and habitat)
  - Land/water management
- Invasive:
  - Prevent introductions (inspection)
  - Response to introductions (detection efforts, quarantine, control/eradication efforts)

Costs of Strategies

- Habitat loss:
  - Opportunity cost of restricting land use or land/water management for conservation purposes
  - Direct management costs
- Invasive:
  - Direct management costs (inspection, detection, control…)
  - Opportunity cost (trade reduction)

Cost-Benefit Approach

- In principle: can apply cost-benefit analysis of various strategies of preventing habitat loss and invasions
- Difficult issues:
  - Understanding consequences of strategy
  - Estimating dollar value of benefits (may want cost-effective analysis rather than cost-benefit)

Understanding the Consequences of Strategies

- Habitat loss: what is the likely effect on species from change in spatial pattern and extent of habitat?
- Invasive: what is likely biological effect of a control strategy on target invasive species?
- Primarily biological issues

Understanding the Consequences of Strategy

- Important elements of biological response that require working with entomologists, ecologists….
- Vital importance of biological scientists and economists working jointly on an integrated analysis
- Integrated analysis tied to decision-making/policy context

Spatial Aspects

- Habitat loss: spatial pattern of habitat is important for determining population viability. Central role of spatial analysis: "where" matters
- Invasive: introductions related to trade flows, spread of invasive species and control efforts all have spatial dimension

Spatial Externalities

- Individual landowner decisions generates social benefits and costs that accrue beyond the landowner
  - habitat: species viability depends on broader landscape beyond just one property
  - invasive: actions taken to prevent introduction and spread have benefits to other landowners
- Role for policy

An Important Difference

- Invasive: preventing introductions and spread of invasive species - problem of the weakest link

Policy Issues

- Habitat loss - Endangered Species Act has been used to prevent “taking” a listed species, which includes adverse habitat modification
- Invasive - inspection and control authority
- Problems:
  - shortage of funding
  - lack of incentives to abide by regulation

Potential Policy Response

- Introduce policies that address both funding and incentive issues
- An example: insurance/liability policy
  - certain classes of products (e.g., exotic pets) pose risks of introducing invasive species
  - require insurance to cover potential liability from damages of introduction

Summary Comments

- Vital importance of integrated biological and economic analysis
- Research issues:
  - understanding consequences of various strategies
  - policy design questions